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(8 of 17785)

United States Patent
Bjerkvig

6,926,888
August 9, 2005

Alginate capsules for use in the treatment of brain tumor

Abstract

Encapsulated producer cells which are capable of expressing a molecule which is an inhibitor of CNS tumour growth provide a novel approach to the treatment of tumours, such as brain tumors which are localized within the central nervous system.

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Claims

1. A composition comprising a producer cell that expresses a molecule that is an inhibitor of the growth of a CNS tumor, the cell being encapsulated in a matrix that comprises an immunoisolating alginate having a G content of above 15%, wherein the molecule is endostatin, angiostatin, thrombospondin, or prolactin; the producer cell is encapsulated in a bead or microbead; and the alginate concentration within the bead or microbead increases from the center of the bead or the microbead to the outer rim.
2. The composition according to claim 1, wherein the alginate has a G content of above 50%.
3. The composition according to claim 1, wherein the alginate has a G content of 60%-80%.
4. The composition according to claim 1, wherein the alginate has a G content of 80%-100%.
5. The composition according to claim 1, wherein the cell's expression of endostatin, angiostatin, thrombospondin, or prolactin is switched on and off by an external pharmacological agent.
6. The composition of claim 1, wherein the CNS tumor is a brain tumor.
7. The composition according to claim 1, wherein the alginate is substantially free of endotoxin.
8. A method of producing the composition according to claim 1, comprising introducing, in a drop-wise manner, a mixture of the producer cells that express a molecule that is endostatin, angiostatin, thrombospondin, or prolactin and the alginate into a solution containing multivalent cations.
9. A method of producing the composition according to claim 1, comprising the step of adding, in a drop-wise manner, an alginate solution containing at least one viable cell that expresses a molecule that is endostatin, angiostatin, thrombospondin, or prolactin to a calcium-containing solution.

10. A pharmaceutical composition comprising (a) the composition according to claim 1 and (b) a pharmaceutically acceptable carrier or diluent.
 11. A method of treating a mammalian patient afflicted with a CNS tumor comprising the step of administering to the patient an effective amount of the pharmaceutical composition according to claim 10.
 12. The method of treatment according to claim 11, wherein the CNS tumor is a brain tumor.
 13. The composition according to claim 1 wherein the producer cell comprises a plasmid that includes a nucleic acid sequence that encodes endostatin, angiostatin, thrombospondin, or prolactin.
 14. The method according to claim 8 wherein the solution containing multivalent cations is substantially free of sodium chloride.
 15. The method according to claim 9 wherein the solution containing multivalent cations is substantially free of sodium chloride.
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